

ABSTRACT OF THE DISCLOSURE

An optical wave power control device and method enables signal control,
5 such as modulation and switching, to be effected within an uninterrupted
propagation element, e.g. an optical fiber or planar waveguide. The propagation
element is configured such that a portion of its wave guided power encompasses the
exterior surface of the element, intercepting the periphery of an adjacent high Q
volumetric resonator. Power of a chosen resonant wavelength is coupled into the
10 resonator, where it circulates with very low loss in accordance with the principles of
a whispering gallery mode device, and returns energy to the propagation element.
By introducing loss within the resonator, the propagated power can be varied
between substantially full and substantially zero amplitudes. Loss factors can be
maintained such that the resonator is overcoupled, i.e. parasitic losses are less than
15 coupling losses, and a critical coupling condition exists in which a small swing in
the control effect causes a disproportionate change in the optical output signal